

PATENT

Atty. Docket No. QCS-003DV

(6695/4)

Particulars of prior application:

Serial No.: 09/003,670

Filing Date: January 7, 1998

Examiner: A. Markoff of Art Unit 1746

Status: Allowed

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Kamieniecki

SERIAL NUMBER: Not yet assigned GROUP NUMBER: Not yet assigned

FILING DATE: October 10, 2001 EXAMINER: Not yet assigned

TITLE: APPARATUS AND METHOD FOR RAPID PHOTO-
THERMAL SURFACE TREATMENT

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

This preliminary amendment is filed pursuant to the filing of a divisional application claiming priority to U.S. Patent Application Serial Number 09/003,670 filed on January 7, 1998.

Kindly enter the following preliminary amendment in the above-identified patent application, prior to examination.

In the Specification

At page 1, before line 1, please insert the heading and following paragraph:

RELATED APPLICATIONS

This application is a divisional application of U.S. Application No. 09/003,670 filed on January 7, 1998.

In the Claims

Please cancel claims 1-17, and amend claim 18 as follows.

18. (Amended) An apparatus for surface treating a semiconductor wafer comprising:
- a surface treatment chamber; and
 - a source of radiation illuminating a semiconductor wafer disposed inside the chamber under ambient pressure and atmosphere with a radiation having a wavelength in a near infrared range sufficient to create a plurality of electron-hole pairs near a surface of the wafer and to desorb any contaminant adsorbed on the surface of the wafer.

Please add the following claims:

- 27. A method for characterizing a semiconductor wafer comprising:
- restoring an inversion condition at a surface of the wafer by illuminating the surface of the wafer with light; and
 - measuring an electrical characteristic of the wafer using the inversion condition as a reference point.
28. The method of claim 27 wherein the wafer comprises a p-type wafer.

29. The method of claim 27 wherein restoring an inversion condition comprises restoring a positive charge at the surface of the wafer.--

Remarks

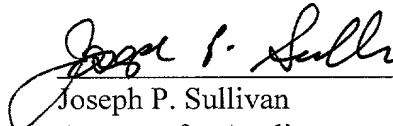
Applicant has canceled claims 1-17 and amended claim 18 and added claims 27-29. The amendment and new claims are fully supported by the disclosure and no new matter has been added.

The undersigned attorney respectfully requests that the above amendments be entered. Subsequently, prompt and favorable action is earnestly solicited.

Respectfully submitted,

Date: October 10, 2001
Reg. No. 45,349

Tel. No. (617) 248-7677
Fax: (617) 248-7100



Joseph P. Sullivan
Attorney for Applicants
Testa, Hurwitz, & Thibault, LLP
High Street Tower
125 High Street
Boston, Massachusetts 02110

Testa, Hurwitz & Thibault, LLP

MARKED UP VERSION OF AMENDMENTS TO THE SPECIFICATION

At page 1, before line 1:

RELATED APPLICATIONS

This application is a divisional application of U.S. Application No. 09/003,670 filed on January 7, 1998.

MARKED UP VERSION OF AMENDMENTS TO THE CLAIMS

Claim 18 was amended as follows:

18. (Amended) An apparatus for surface treating a semiconductor wafer comprising:
- a surface treatment chamber; and
- a source of radiation illuminating a semiconductor wafer disposed inside the chamber under ambient pressure and atmosphere with a radiation having a wavelength in a near infrared range sufficient to create a plurality of electron-hole pairs near a surface of the wafer and to desorb any contaminant adsorbed on the surface of the wafer.

New claims 27-29 were added as follows:

27. A method for characterizing a semiconductor wafer comprising:
- restoring an inversion condition at a surface of the wafer by illuminating the surface of the wafer with light; and
- measuring an electrical characteristic of the wafer using the inversion condition as a reference point.
28. The method of claim 27 wherein the wafer comprises a p-type wafer.
29. The method of claim 27 wherein restoring an inversion condition comprises restoring a positive charge at the surface of the wafer.

CLEAN COPY OF ALL PENDING CLAIMS

18. (Amended) An apparatus for surface treating a semiconductor wafer comprising:

a surface treatment chamber; and

a source of radiation illuminating a semiconductor wafer disposed inside the chamber under ambient pressure and atmosphere with a radiation having a wavelength in a near infrared range sufficient to create a plurality of electron-hole pairs near a surface of the wafer and to desorb any contaminant adsorbed on the surface of the wafer.
19. The apparatus of claim 18 wherein the surface treatment chamber is integrated with an in-line, real-time testing apparatus, such that electrical characteristics of the wafer can be measured.
20. The apparatus of claim 19 wherein a surface photovoltage of the wafer is measured after the wafer has been surface treated.
21. The apparatus of claim 18 wherein the source of radiation comprises a tungsten halogen quartz lamp.
22. The apparatus of claim 18 further comprising a plurality of reflectors disposed inside the surface treatment chamber to provide uniform illumination of the wafer.
23. The apparatus of claim 18 further comprising a power control circuitry for controlling an intensity of radiation from the radiation source.
24. The apparatus of claim 18 further comprising a temperature sensor for monitoring radiation from the wafer during surface treatment.

25. The apparatus of claim 18 further comprising a filter disposed between the radiation source and the wafer for filtering radiation having wavelength greater than about 4 microns.

26. The apparatus of claim 18 further comprising a first filter disposed between the radiation source and the wafer, a second filter disposed adjacent the first filter, and an air passageway disposed between the first filter and the second filter for cooling the filters, wherein the first filter and the second filter prevents radiation having wavelengths greater than about 4 microns from reaching the wafer.

27. A method for characterizing a semiconductor wafer comprising:
restoring an inversion condition at a surface of the wafer by illuminating the surface of the wafer with light; and
measuring an electrical characteristic of the wafer using the inversion condition as a reference point.

28. The method of claim 27 wherein the wafer comprises a p-type wafer.

29. The method of claim 27 wherein restoring an inversion condition comprises restoring a positive charge at the surface of the wafer.